

## WORKSHOP 1: STUDENT SHEET 3

### Standard Deviation - Explanatory Note for Students

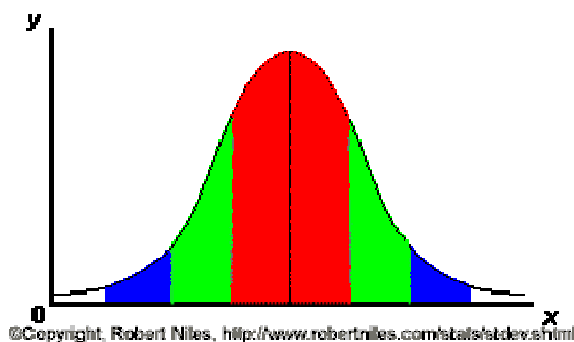
One standard deviation away from the mean in either direction on the horizontal axis (the red area on the graph) accounts for about 68 percent of the values in this group.

Two standard deviations away from the mean (the red and green areas) account for roughly 95 percent of the values.

And three standard deviations (the red, green and blue areas) account for about 99 percent of the values.

If this curve were flatter and more spread out, the standard deviation would have to be larger in order to account for those 68 percent or so of the values.

$$s = \sqrt{\frac{\sum X^2 - \bar{X}^2}{n}}$$



- s - standard deviation
- $\sum X^2$  - (Sum of the values) squared
- $\bar{x}^2$  - (Average of the Values) squared
- n - number of values

#### Standard deviation - note for teachers

This is a dodgy bit of maths for strikes. It sort of works if you look at strikes which are centred round  $180^\circ$ . The problem is that a strike of  $180^\circ$  is the same as a strike of  $360^\circ$  so the standard deviation goes pear-shaped unless you convert all the strikes to between  $90^\circ$  and  $270^\circ$  which is sort of O.K. for this example because the readings are so close to  $180^\circ$ .

You need to look up the significance of the Standard deviation in books from the maths department.

I insist for A5a that students can explain what standard deviation does.

A real mathematician would have kittens at this mistreatment of maths but most AS students seem to cope with the logic and can understand standard deviation.